CLAIMS

What is claimed is:

1. A method for registering a mobile node with a home agent comprising:

determining a home agent;

establishing between the mobile node and the determined home agent a security tunnel having associated with said tunnel a single security association; and

registering the mobile node with the home agent using the security tunnel.

2. The method of Claim 1 wherein establishing a security tunnel comprises:

creating a security policy database for at least one of a binding update message, a return routability message, prefix discovery message and payload data packet; and

associating two or more security policy databases with a security tunnel using a single security association.

3. The method of Claim 1 wherein registering the mobile node with the home agent comprises:

dispatching a binding update request to the home agent using the security tunnel; and

receiving a binding update acknowledgement by way of a reverse path security tunnel.

4. The method of Claim 1 further comprising discovering an applicable prefix for the home agent using the security tunnel.

5. The method of Claim 1 further comprising conveying data to a correspondent node using the security tunnel.

6. The method of Claim 1 further comprising communicating a return routability signal to the home agent using the security tunnel.

7. The method of Claim 1 further comprising establishing a reverse path security tunnel having associated with said tunnel a single security association.

8. The method of Claim 7 wherein establishing a reverse path security tunnel comprises

creating a security policy database for at least one of a binding update message, a return routability message, prefix discovery message and payload data packet; and

associating one or more security policy databases with a security tunnel using a single security association.

9. A mobile node comprising:

mobile communication interface capable of communicating with a mobile network;

home agent determination unit capable of identifying a home agent;

security tunneling unit capable of establishing and maintaining a security tunnel between the mobile node and an identified home agent, wherein an established security tunnel uses a single security association descriptor for one or more data paths; and

registration unit capable of registering the mobile node with an identified home agent using an established security tunnel.

10. The mobile node of Claim 9 wherein the security tunnel unit comprises:

security association descriptor capable of storing a security association;

security policy descriptor capable of storing a security policy for at least one of a binding update message, a return routability message, a prefix discovery solicitation message and a payload data packet;

messaging unit capable of formatting a secure message according to an incoming message that includes at least one of a binding update message, a return routability message, a prefix discovery message and a payload data packet and according to a security association stored in the security association descriptor and further capable of formatting a secure message using a security policy

stored in any of the security policy descriptors, wherein the security policy descriptor is selected according to the type of the incoming message.

11. The mobile node of Claim 9 wherein the registration unit comprises:

binding request message unit that directs to the security tunneling unit a binding message directed to a home agent according to an indicator received from the home agent determination unit; and

binding acknowledgement unit that receives a binding update acknowledgement from the security tunneling unit according to a tunneling packet received from the home agent using a reverse path security tunnel.

12. The mobile node of Claim 9 further comprising a prefix discovery unit capable of discovering an applicable prefix for the determined home agent using the established security tunnel.

13. The mobile node of Claim 9 further comprising a payload unit capable of accepting data from a client and directing it to the security tunneling unit.

14. The mobile node of Claim 9 further comprising route discovery unit capable of dispatching a return routability message to the security tunneling unit.

15. The mobile node of Claim 9 wherein the security tunneling unit is capable of establishing and maintaining a reverse path security tunnel between the mobile node and an identified home agent.

16. The mobile node of Claim 15 wherein the security tunneling unit comprises:

reverse path security association descriptor capable of storing a security association;

reverse path security policy descriptor capable of storing a security policy for at least one of a binding update acknowledgement message, a return routability reply message, a prefix discovery advertisement message and a return payload data packet wherein the messaging unit is capable of unsecuring a secure tunneling message according to a security association stored in the reverse

path security association descriptor and according to a security descriptor stored in at least one of the reverse path security policy descriptors wherein the reverse path security policy descriptor is selected according to the type of secure tunneling message received.

17. A mobile node comprising:

processor for executing instruction an sequence;

memory for storing an instructions sequence;

mobile communications interface for communicating with a mobile network;

instruction sequences stored in the memory including:

home agent determination instruction sequence that, when executed by the processor, minimally causes the processor to identify a home agent for the mobile node;

security tunneling instruction sequence that, when executed by the processor, minimally causes the processor to establish a security tunnel from the mobile node to an identified home agent where the security tunnel uses a single security association descriptor to secure a plurality of data paths; and

registry instruction sequence that, when executed by the processor, minimally causes the processor to register the mobile node with an identified home agent.

18. The mobile node of Claim 17 wherein the security tunneling instruction sequence causes the processor to establish a security tunnel by minimally causing the processor to create a single security association that can be used by a plurality of data paths, including, but not limited to data paths for a binding update message, a return routability message, a prefix discovery message and a payload data packet.

19. The mobile node of Claim 17 wherein the registry instruction sequence causes the processor to register the mobile node by minimally causing the processor to dispatch a

binding update request to an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

20. The mobile node of Claim 17 further comprising a prefix discovery instruction sequence that, when executed by the processor, minimally causes the processor to discover a prefix for an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

21. The mobile node of Claim 17 further comprising a payload instruction sequence that, when executed by the processor, minimally causes the processor to direct a payload data packet to an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

22. The mobile node of Claim 17 further comprising a return path verification instruction sequence that, when executed by the processor, minimally causes the processor to direct a return routability message to an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

23. The mobile node of Claim 17 wherein the security tunneling instruction sequence further minimally causes the processor to establish a reverse path security tunnel capable of carrying a plurality of data paths using a single security association.

24. The mobile node of Claim 23 wherein the security tunneling instruction sequence, when executed by the processor, minimally causes the processor to establish a reverse path security tunnel by:

creating a security policy database for at least one of a binding update message, a return routability message, prefix discovery message and payload data packet; and

associating one or more security policy databases with a reverse path security tunnel using a single security association.

25. A computer readable medium having imparted thereon instruction sequences for registering a mobile node with a home agent including:

home agent determination instruction sequence that, when executed by a processor, minimally causes the processor to identify a home agent for the mobile node;

security tunneling instruction sequence that, when executed by a processor, minimally causes the processor to establish a security tunnel from the mobile node to an identified home agent where the security tunnel uses a single security association descriptor to secure a plurality of data paths; and

registry instruction sequence that, when executed by a processor, minimally causes the processor to register the mobile node with an identified home agent.

26. The computer readable medium of Claim 25 wherein the security tunneling instruction sequence causes a processor to establish a security tunnel by minimally causing the processor to create a single security association that can be used by a plurality of data paths, including, but not limited to data paths for a binding update message, a return routability message, a prefix discovery message and a payload data packet.

27. The computer readable medium of Claim 25 wherein the registry instruction sequence causes the processor to register the mobile node by minimally causing the processor to dispatch a binding update request to an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

28. The computer readable medium of Claim 25 further comprising a prefix discovery instruction sequence that, when executed by the processor, minimally causes the processor to discover prefix for an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

29. The computer readable medium of Claim 25 further comprising a payload instruction sequence that, when executed by the processor, minimally causes the processor to direct a payload data packet to an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

30. The computer readable medium of Claim 25 further comprising a return path verification instruction sequence that, when executed by the processor, minimally causes the

processor to direct a return routability message to an identified home agent using a security tunnel established by the processor when it executes the security tunneling instruction sequence.

31. The computer readable medium of Claim 25 wherein the security tunneling instruction sequence further minimally causes the processor to establish a reverse path security tunnel capable of carrying a plurality of data paths using a single security association.

32. The computer readable medium of Claim 31 wherein the security tunneling instruction sequence, when executed by the processor, minimally causes the processor to establish a reverse path security tunnel by:

creating a security policy database for at least one of a binding update message, a return routability message, prefix discovery message and payload data packet; and

associating one or more security policy databases with a reverse path security tunnel using a single security association.

33. A mobile node comprising:

means for determining a home agent;

means for establishing a single-security-association based security tunnel between the mobile node and a determined home agent; and

means for registering the mobile node using an established security tunnel.

34. The apparatus of Claim 33 wherein the means for establishing a single-security association based security tunnel comprises means for associating a plurality of security policy databases with a single security association.

35. The apparatus of Claim 33 wherein the means for registering the mobile node comprises:

means for dispatching a binding update message to an identified home agent using an established security tunnel; and

means for receiving a binding update acknowledgement by way of a reverse path security tunnel.

36. The apparatus of Claim 33 further comprising a means for discovering an applicable prefix for the home agent using an established security tunnel.

37. The apparatus of Claim 33 further comprising a means for conveying data to a correspondent node using an established security tunnel.

38. The apparatus of Claim 33 further comprising a means for communicating a return routability signal to a determined home agent using an established security tunnel.

39. The apparatus of Claim 33 further comprising a means for establishing a reverse path single-security-association based security tunnel.

40. The apparatus of Claim 39 wherein the means for establishing a reverse path security tunnel comprises means for associating a plurality of security policy databases with a single security association.